

In re Application of BARHAM et al.
Serial No. 10/010,881

REMARKS

Claims 1-53 are now pending in this application. The Office action has been carefully considered. Claims 1-4, 6, 8-10, 11, 13, 17-20, 22-24, 31, 34, 37, 39-41, 45, and 50-51 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim subject matter which applicant regards as the invention. Claim 8 was also objected to for an informality. Claims 1-2, 4-6, 8, 10, and 52-53 were rejected as being anticipated under 35 U.S.C. § 102(e) by Davies et al., U.S. Patent No. 6,483,805 (hereinafter "Davies"). Additionally, claim 7 was rejected as being unpatentable under 35 U.S.C. § 103(a) over Davies. Furthermore, claims 3 and 9 were rejected as being unpatentable under 35 U.S.C. § 103(a) over Davies in view of Zikan et al., U.S. Patent No. 6,310,881 (hereinafter "Zikan"). Additionally, claims 11-51 were rejected as being unpatentable under 35 U.S.C. § 103(a) over Davies in view of Krishnamurthy et al., U.S. Patent No. 6,910,024 (hereinafter "Krishnamurthy").

By present amendment, claims 1-4, 6, 8, 11, 13-14, 17-20, 22-25, 31, 34, 37, 39-41, 45, and 50-53 have been amended for clarification and not in view of the prior art. Applicants submit that the claims as filed were patentable over the prior art of record, and that the amendments herein are for purposes of clarifying the claims and/or for expediting allowance of the claims and not for reasons related to patentability. Reconsideration is respectfully requested.

Regarding the 35 U.S.C. § 112 rejections, the Office action rejected claims 1-4, 6, and 8-10 for insufficient antecedent basis. Claims 1-4, 6, and 8-10 have been amended for clarification. Applicants respectfully submit that amended claims 1-4, 6, and 8-10

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meet the requirements of 35 U.S.C. § 112. The Office action rejected claims 11, 13, 17-20, 22-24, 31, 34, 37, 39-41, 45, 50-51 alleging that they were indefinite. Applicants disagree that claims 11, 13, 17-20, 22-24, 31, 34, 37, 39-41, 45, 50-51 are indefinite. Nevertheless, for further clarification, claims 11, 13, 17-20, 22-24, 31, 34, 37, 39-41, 45, 50-51 have been amended. Applicants respectfully submit that claims 11, 13, 17-20, 22-24, 31, 34, 37, 39-41, 45, 50-51 as amended meet the requirements of 35 U.S.C. § 112.

Turning to the 35 U.S.C. § 102(e) rejections, one or more aspects (hereinafter "aspects") of the subject matter disclosed by applicants relate to reducing network congestion, essentially by combining aspects of congestion notification and congestion pricing. For example, congestion pricing triggers the sender into reducing transmit rates. In general, mechanisms for removing each flow's bottleneck is deliberately moved into the source, such as into its operating system, thereby reducing queuing and latency in the network itself. A cooperative distributed algorithm is used to adjust these artificial bottlenecks so as to proportionally share bandwidth according to a globally consistent policy. Significantly, the network runs in a less congested state, and enables proportional sharing of bandwidth. Congestion is avoided by the use of continuous feedback, rather than by providing notification once congestion had occurred. The present invention also facilitates the use of heterogeneous protocols.

As such, aspects of the subject matter disclosed are directed to assigning each flow (which may be anything from a single TCP connection to a large aggregate) a weight. The source operating system introduces an artificial bottleneck for the flow, e.g., using a token-bucket shaper with a sustained rate. Routers on the path taken by the flow maintain and advertise a path load estimate. End-systems voluntarily adjust the artificial

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bottleneck, e.g., such that the rate equals the weight divided by the load estimate. The load estimate is adjusted (e.g., relatively slowly) up or down by routers such that the aggregate arrival rate matches a target utilization of the bottleneck link. Setting the target utilization to something less than full utilization (e.g., ninety percent) has been found to dramatically reduce the mean queue length.

Example embodiments of the subject matter disclosed by applicants further include packets that may carry two additional fields, referred to herein as LOAD and RLOAD. As outbound packets pass through routers, the aggregate demand for resources on its route is accumulated in the LOAD field. When a packet reaches its destination, this information is recorded and periodically returned to the source in the RLOAD field of any packet traveling in the opposite direction, (which is not necessarily a symmetric route). For example, the RLOAD message may be included in the next IP packet going from the destination to the source (e.g. a TCP ACK segment), but it may alternatively be conveyed in a separate packet if the flow has no back-channel. When received, the source system adjusts the sustained token rate of the token-bucket shaper according to the incoming load notification messages and the flow weight parameter. Avoidance is thus achieved according to the cooperative distributed algorithm. Note that the above description is for example and informational purpose only and should not be used to interpret the claims, which are discussed below.

Claim Rejections under §102

The Office action rejected independent claims 1, 8, and 52 under 35 U.S.C. § 102(e) as being anticipated by Davies. However, each of these claims

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essentially recites controlling, at a source, a rate of a flow of packets from the source to a destination. In contrast to the claims, Davies never teaches or even suggests anything but, “[e]ach router comprises a processor 10a connected to input streams ... As each packet passes through a router in a network, the router can keep track of the difference between the number of transaction start (A) and transaction end (C) packets which have passed in a particular direction ... The router can then use this traffic information to limit the total number of transactions in progress.” Davies, col. 8, lines 27-44. In other words, Davies discloses a mechanism for controlling the flow of traffic *at routers* instead of “at a source” as recited by applicants. In fact, a thorough reading of Davies in its entirety fails to provide any indication that Davies even contemplates controlling, at a source, a rate of a flow of packets from the source to a destination.

Anticipation under 35 U.S.C. § 102 requires the disclosure in a single prior art reference of each and every element of the claim under consideration, and each element must be arranged as in the claim. Davies does not teach or in any way come close to suggesting receiving network load information corresponding to network load, at a source of network packets, wherein the network load information is determined by network traffic, and controlling a rate of a flow of packets at the source based on the network load information and a weight value associated with the flow as essentially recited in claim 1. For at least the above reasons, Davies fails to meet the requirements for supporting a §102 rejection of this claim, and applicants respectfully request reconsideration and withdrawal of the rejection of claim 1 based on Davies. Therefore, claim 1 and the claims that depend thereon are patentable over the cited art.

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Similarly, Davies does not teach or suggest a system including a source of a flow of data, a destination node that receives at least some of the flow of data from the source, a router between the source and destination that is configured to compute network load and associate load value information of the router corresponding to the network load with the data, a mechanism configured to provide the value corresponding to the network load to the source, and the source including a mechanism that controls a rate of flow of further data based on the value corresponding to the network load and a weight associated with the flow of further data as essentially recited in claim 8. For at least the above reasons, Davies fails to meet the requirements for supporting a §102 rejection of this claim, and applicants respectfully request reconsideration and withdrawal of the rejection of claim 8 based on Davies. Therefore, claim 8 and the claims that depend thereon are patentable over the cited art.

Additionally, Davies does not teach or suggest receiving load information corresponding to network load at a destination of network packets, wherein the network load information is determined by network traffic, and at a source controlling a rate of a flow of packets from the source to the destination based on the load information and a weight value associated with the flow as essentially recited in claim 52. For at least the above reasons, Davies fails to meet the requirements for supporting a §102 rejection of this claim, and applicants respectfully request reconsideration and withdrawal of the rejection of claim 52 based on Davies. Therefore, claim 52 and the claims that depend thereon are patentable over the cited art.

Moreover, Davies does not disclose, suggest, or remotely hint at controlling, at a source, a rate of a flow of packets from the source to a destination. Rather, if anything,

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Davies *teaches away* from doing so as Davies discloses a mechanism for controlling the flow of traffic *at routers*. Davies, col. 8, lines 27-44. Throttling packets at each of the sources of the packets within the network, corresponding to the claims, is unquestionably *not* the same as controlling a rate of flow of packets at centralized sources (e.g., routers) as in Davies.

Claim Rejections under §103(a)

Turning to the 35 U.S.C. § 103(a) rejections, independent claims 11, 25, and 45 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Davies in view of Krishnamurthy. However, these rejections are improper, as by law, in order to establish prima facie obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). In addition, "all words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). Further, if prior art, in any material respect teaches away from the claimed invention, the art cannot be used to support an obviousness rejection. *In re Geisler*, 116 F.3d 1465, 1471, 43 USPQ2d 1362, 1366 (Fed Cir. 1997).

Referring to the rejection of claim 11, claim 11 generally recites: obtaining price information corresponding to network load at the computer system, the price information being determined by actual network traffic relative to network capacity; and controlling a rate of transmitting data at a source on the network based on the price information and a value representative of a willingness to pay threshold. In contrast and as argued above, Davies does not deal with controlling a rate of transmitting data at a source on the

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network. Rather, Davies is directed toward a mechanism for controlling the flow of traffic at routers. Davies, col. 8, lines 27-44. Significantly, Krishnamurthy does not cure the deficiencies of Davies. The Office action states, "[t]he pricing information, although not taught in Davies, is taught in Krishnamurthy in the same field endeavor of controlling rates of traffic based on load." Office action, pg. 8, sec. 38. Krishnamurthy does not disclose, suggest, or remotely hint at controlling a rate of transmitting data at a source on the network. Therefore, in any possibly permissible combination, Krishnamurthy and Davies do not disclose or suggest controlling a rate of transmitting data at a source. Thus, in any permissible combination, the cited references fail to disclose or suggest applicants' claimed subject matter. Furthermore and as argued above, Davies actually *teaches directly away* from controlling a rate of flow of packets at a source. Applicants respectfully request that the Davies reference be removed.

In summary, neither Davies nor Krishnamurthy, alone or in any permissible combination, teach, disclose, or remotely hint at the limitations of applicants' claim 11. At least for these reasons, claim 11 and the claims that depend thereon are patentable over the cited art.

Moreover, the Office action does not provide proper motivation for combining Davies with the subject matter discussed in Krishnamurthy. However, by law, in order to support a § 103(a) rejection, there must be some teaching, suggestion, or motivation other than applicants' teachings for modifying a cited reference or combining references to achieve the claimed invention. The Office action does not indicate any suggestion or motivation in the prior art of record, either explicit or otherwise, for modifying the references or combining the references in a manner that would achieve the claimed

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invention, or point out any teaching as to how such a modification or combination might be accomplished, or what might be accomplished thereby. Instead the Office action merely recites, "it would have been obvious...to modify the Davies invention with the pricing teachings of Krishnamurthy for commercial success as well as controlling the available resources of the network based upon who is willing to pay for those resources. (Krishnamurthy, column 4, lines 21-25) Davies supports this combination in Column 3, lines 14-20 and column 2, lines 19-22. Office action, pg. 8, sec. 38.

Applicants strongly and wholly disagree with this unsupported conclusion. A closer reading of the cited text reveals the Davies cite is to the 'Background to the Invention' section of the patent that states, "[i]t is becoming clear that certain customers and types or applications need (and customers would be prepared to pay for) a service that is implemented over existing best efforts service." Davies, col. 2, lines 19-22. It is unclear to the applicants how this cite as well as the other cites could possibly provide proper motivation to combine Davies with Krishnamurthy to achieve the subject matter as claimed by applicants. Such broad, conclusory statements do not come close to adequately addressing the issue of motivation to combine, are not evidence of obviousness, and therefore are improper as a matter of law. In re Dembiczak, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

Furthermore, even if the references were somehow combinable in the manner suggested by the Office action (which applicants submit is not permissible), they would still fail to teach controlling a rate of transmitting data at a source as generally recited in claim 11. At least for this additional reason, claim 11 and the claims that depend thereon are patentable over the cited references.

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Similarly, independent claims 25 and 45 are each patentable over the cited art. As discussed above, neither Davies nor Krishnamurthy nor any permissible combination of Davies and Krishnamurthy disclose or suggest controlling a rate of transmitting data at a source as generally recited in claims 25 and 45. For at least this reason, claims 25 and 45, and the claims that depend thereon, are patentable over the cited references.

For at least the above reasons, applicants submit that all the claims are patentable over the prior art of record. Reconsideration and withdrawal of the rejections in the Office action is respectfully requested and early allowance of this application is earnestly solicited.

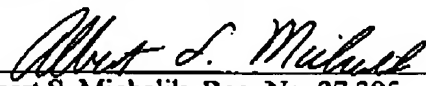
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CONCLUSION

In view of the foregoing remarks, it is respectfully submitted that claims 1-53 are patentable over the prior art of record, and that the application is in good and proper form for allowance. A favorable action on the part of the Examiner is earnestly solicited.

If in the opinion of the Examiner a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney at (425) 836-3030.

Respectfully submitted,


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